

EH&S TIPS

Technical Information & Practical Solutions

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Many researchers who ship non-dangerous materials that must remain at a very low temperature during transportation use "dry shippers."

A "dry shipper" is properly prepared for transport when it:

- **Contains non-dangerous products.**
- **Will not allow the build-up of pressure within the container.**
- **Will not permit the release of any refrigerated liquid nitrogen regardless of the dry shipper's orientation.**

Properly filled "dry shippers" are not subject to regulation as a Hazardous Material by USDOT. Improperly filled "dry shippers" present a risk of liquid nitrogen leakage and are subject to regulation by the USDOT should spillage occur.

Violations of USDOT shipping regulations may result in the assessment of civil penalties, criminal penalties, or both.

University of Washington
Environmental Health and Safety
Box 354400
www.ehs.washington.edu

Nitrogen "Dry Shippers"

"Dry shippers"

Correctly prepared "dry shippers" do not contain free liquid nitrogen. The dry shippers are capable of maintaining the materials in them at liquid nitrogen temperatures for 24 hours without the risk of spilling liquid nitrogen.

While liquid nitrogen is a regulated United States Department of Transportation (USDOT) Hazardous Material, a properly prepared "dry shipper" is not. This allows for more flexibility and less cost when shipping non-hazardous frozen materials.

Filling "dry shippers"

Follow the manufacturer's instructions for filling. Some general practices when filling the dry shipper are:

1. Wear insulated gloves made for handling liquid nitrogen and a face shield.
2. Add the liquid nitrogen slowly since a significant volume of nitrogen gas will form as the cold liquid contacts the warm surfaces.
3. When the liquid level reaches the neck of the dry shipper, stop filling. Replace the cap and set the dry shipper aside for the period specified by the manufacturer to allow the liquid nitrogen to saturate the absorbent.
4. Repeat steps 1-3 until the liquid level no longer drops on standing. This may require as many as 15 repetitions.

Some manufacturers have empty and full weights for their dry shippers. Dry shippers that will not achieve their full weight may indicate a problem with the absorbent's ability to hold the nitrogen. This may prevent maintaining liquid nitrogen temperature during shipment and may damage your samples. Contact the manufacturer to determine if the dry shipper is safe to use.

Preparing "dry shippers" for transport

Remove **all** free liquid nitrogen from the "dry shipper" before transport.

1. Wear insulated gloves and a face shield when emptying the dry shipper.
2. Empty the dry shipper by inverting it in an appropriate area.
3. Do not pour liquid nitrogen onto the floor since it could splash onto your shoes or legs and cause severe burns. It is a good idea to pour the excess liquid nitrogen back into a large liquid nitrogen dewar.
4. Hold the dry shipper upside down until the liquid stops flowing.
5. Stand the dry shipper upright for the period specified by the manufacturer.
6. Repeat steps 1-4 as many times as necessary to remove any remaining liquid nitrogen.
7. Place your canes of material into the dry shipper and replace the cap.
8. Place the dry shipper into the case supplied by the manufacturer.
9. Complete and sign the "Dry Shipper" Checklist on the back of the TIPS sheet. Keep the Checklist until the dry shipper has safely reached its destination.

*Be sure that the materials you are transporting are **not** hazardous materials such as samples frozen in propane, ethane, halocarbon or other hazardous gas, or an infectious substance. If you have questions concerning this TIPS sheet or shipping any hazardous materials, contact the Environmental Health and Safety Hazardous Materials Shipping Coordinator at (206) 685-2849.*